

PCT

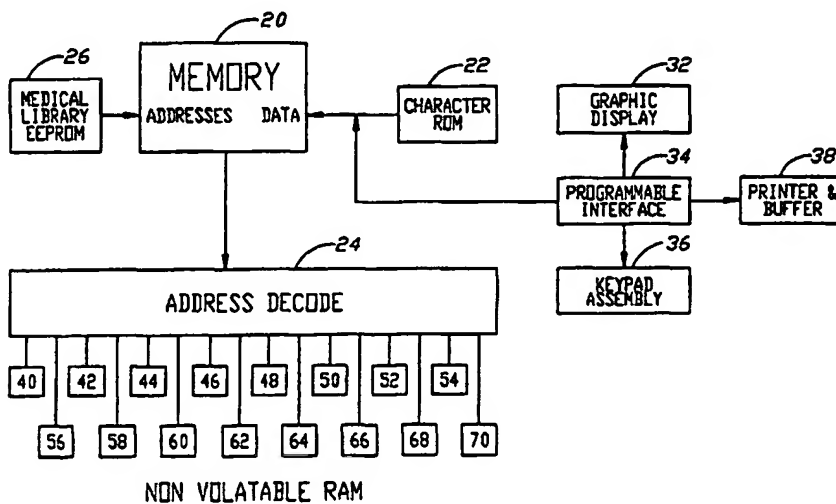
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International Bureau



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(54) Title: ELECTRONIC HAND-HELD PRESCRIPTION WRITING AND TRANSMITTING DEVICE



(57) Abstract

A portable hand-held drug prescription printing apparatus (90) and method (fig. 4A, 4B, 4C) of using same to print drug prescriptions (fig. 10) includes a keyboard (36), display screen (32), computer (20) with software and data storage capability and an attached portable printer (38) to print prescription (fig. 10) on a mobile basis. Commonly prescribed drugs of a physician permitted access via entry of a physician's security code are printed along with dosage, usage, instructions, refill permission and generic drug substitution permission are printed on a sheet of blank prescription paper together with the physician's heading. Medical history, allergy history and other information particular to each patient is stored and accessed at the time of issue of new prescriptions. A digitizer pencil (90) is used on the display screen (32) for inputting the physician's hand written signature on the printed prescription for printing.

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**ELECTRONIC HAND-HELD PRESCRIPTION WRITING
AND TRANSMITTING DEVICE**

BACKGROUND OF THE INVENTION:

Field of the Invention:

This invention general relates to apparatus and methods for issuing drug prescriptions.

Description of the Prior Art:

Prior art devices are known which are portable and capable of storing software computer programs and other data and accessing such data for various purposes including printing selected stored data.

Software programs used in fixed hospital locations are also known which further store, in some instance, drug information.

However, apparatus or methods for portable storage of drug prescription related information and to issue printed prescriptions on a mobile basis are unknown.

SUMMARY OF THE INVENTION:

Thus, the principal object of the present invention is to provide a hand-held portable drug prescription printing device and method which overcome the shortcomings of the prior art.

The object is achieved by providing hand held, battery powered, portable, prescription printing and transmitting device with means for entering drug prescription related information in storage. The prescription printing and transmitting device includes a physician's prescription list of drugs commonly prescribed by the physician, a security access code for the physician and a prescription heading

including the physician's name and registration number. The apparatus for portably issuing drug prescriptions also comprises means for accessing, through entry of the security access code, from storage for viewing on a display of the hand held portable prescription printing and transmitting device prestored drug prescription related information including patient information and drug related information for a prescription to be printed for the patient, means for hand carrying the hand held portable prescription printing and transmitting device to a site at which a printed prescription for a patient is required, means for creating at the site on the screen with a pencil digitizer a facsimile of the signature of the physician issuing the prescription, means for selecting at the site prestored patient related information and drug related information for printing on the drug prescription and means for printing at the site with the hand held prescription printing and transmitting device a printed prescription on prescription paper a prescription including the prescription heading including the name of the physician corresponding to the security access code and selected prestored patient related information and drug related information.

The object is also achieved by providing a method of portably issuing drug prescriptions comprising the steps of (1) entering for storage drug prescription related information in a hand held, battery powered, portable, prescription printing and transmitting device including a physician's prescription list of drugs commonly prescribed by the physician, a security access code for the physician and a prescription heading including the physician's name and registration number, (2) accessing, through entry of the security access code, from storage for viewing on a display of the hand held portable prescription printing and transmitting device prestored drug prescription related information including patient information and drug related information for a prescription to be printed for the patient, (3) hand carrying the hand held portable prescription printing and

transmitting device to a site at which a printed prescription for a patient is required, (4) creating at the site on the screen with a pencil digitizer a facsimile of the signature of the physician issuing the prescription, (5) selecting at the site prestored patient related information and drug related information for printing on the drug prescription and (6) printing at the site with the hand held prescription printing and transmitting device a printed prescription on prescription paper a prescription including the prescription heading including the name of the physician corresponding to the security access code and selected prestored patient related information and drug related information.

Moreover, the object of the present invention is achieved by provision of a portable, hand-held, drug prescription issuing device, comprising (A) memory means for storing data including patient file number, patient address, patient telephone number, patient medical history, patient allergies, and clinician medication lists, (B) printing means for printing data to include medical history, allergies, diagnosis, and medication reference numbers, (C) computer processing means to interact commands with programmed information and ability to communicate this information by way of the graphic display, printer, or modem transmission, (D) D) communications means including a graphic display printer, and modem transmission output, (E) security means requiring each individual clinician to use a predesignated code number, (F) specialized calculating means to assist the clinician with calculating dosages.

Further objects and advantages of our invention will become apparent from a consideration of the drawings and ensuing description.

BRIEF DESCRIPTION OF THE DRAWINGS:

The foregoing objects and advantageous features of the invention will be explained in greater detail and others will be made apparent from the detailed description of the

preferred embodiment of the present invention which is given with reference to the several figures of the drawing, in which:

Fig. 1 is a perspective view of the present invention showing the outside arrangement of its parts closed by an embodiment of this invention;

Fig. 2 is a front view of the present invention keypad/keyboard assembly and liquid crystal display and printer;

Fig. 3 is a block diagram of the present invention;

Fig. 4A - 4C form a composite flow chart showing the preferred methods of the present invention;

Figs. 5-7 are schematics of the present invention;

Fig. 8 is an example of a prescription printed by invention;

Fig. 9 is an example of the transmission printed by the pharmacy receiving printer;

Fig. 10 is an example of a label printed for application to the prescription bottle;

Fig. 11 lists the key titles;

Fig. 12 is an example of CCD Graphic Display of new patient entry with patient name, address, date, and time;

Fig. 13 is an example of a patient medical history printed according to the present invention;

Fig. 14 is an example of patient of patient allergy history as printed according to the present invention;

Fig. 15 is an example of physician drug database entry; and

Fig. 16 is an example of patient drug use database as viewed on the LCD Graphic Display.

DESCRIPTION OF THE PREFERRED EMBODIMENT:

The benefits of such a device are multiple. This device can be preloaded with a physicians typical prescription list to expedite prescription writing through a predesignated code number. Each prescription will then be printed legibly with the included printer on plain paper (Note that legible

prescriptions are themselves a great benefit). The device can readily recall patient information including patient name, patient file number, patient medication profile to include talks prescribed-quantity of each drug prescribed-date each drug was prescribed and brief history on each patient. The prescription device could be plugged into a modem with transmission of prescriptions directly to the desired pharmacy previously registered with the Rx-script system. Electronic transmission of the prescriptions expedite prescription filling, allows night-time and holiday transmission of prescriptions, eliminates prescription alteration by the patient, and deters prescription fraud or misuse by the patient. If desired, Schedule 2 drugs or other potential drugs of abuse are automatically transmitted to the appropriate governmental agency when the drug prescription is sent to the pharmacy to eliminate the need for duplicate prescription record-keeping as required by some states. The portable nature of this device allows the physician to better assist patients in the public on a mobile basis, if the need arose, while still maintaining a good patient information record.

A. HOW TO ENTER PATIENT DATABASE INFORMATION AND LATER UTILIZE THIS INFORMATION.

Referring now to the drawings:

1. After the power function switch 88 is turned on you are given the choice of "1. Edit" or "2. Operate". The alphanumeric key 36 "1" is then pressed followed by choices "Patient Database 1", "Drug Database 2", "History Database 3", or "Allergy Database 4"--enter "1" to enter all pertinent patient information. The patients name and file number are entered initially by pressing the appropriate alphanumeric keys 36. The patients address is then entered into the computer via the alphanumeric keys 36. Date and time are automatically entered onto each prescription. You now press ENTER 36 to update/add to memory 40-70. Fig. 13 demonstrates the appearance of the device Graphic Display 32 prior to pressing ENTER 36.

2. The patient entered into memory 40-70 as described and A1 is now permanently entered into the device unless erased as an inactive file at a later date. This patient database can be accessed for future use by turning the device power units ON 88 and pressing alphanumeric key 36 "2" when given the choice of "1. Edit" or "2. Operate" on the Graphic Display 32 main screen. You must now press alphanumeric keys 36 representing the patients name or patients file number. The patients address, date and time of prescription are now automatically entered onto the Graphic Display 32 with appearance similar to Fig. 13.

B. HOW TO ENTER DRUG DATABASE INFORMATION AND LATER UTILIZATION OF THIS INFORMATION.

1. After the power function switch is turned ON 88, you are given the choice "EDIT 1" or "Operate 2" on the Graphic Display 32, Enter " 1 " on the alphanumeric keys 36. The Graphic Display 32 then gives you the option to enter "Patient Database 1", "Drug Database 2", "History Database 3", or "Allergy Database 4" - Enter "2" for access to drug database entry. You can then enter your drug code number (i.e. 001, 002, etc.) followed by Drug name, Drug Quantity, and Drug Instructions. After the information entered is satisfactory you press "ENTER" 36 and then you are given the option to "1. Enter New Drug" or "2. Exit". For continued drug entry press alphanumeric key 36 "1" and repeat as directed above. See Fig. 15 or an example entry into the physician drug preference database.

2. To utilize previously entered drug information you must first enter patient name and address information as previously discussed and A1-A2. The Graphic Display 32 now prompts you to "Enter Drug ID number". You then enter the preselected code number for the desired medication which automatically displays the drug information in memory 40-70. The Graphic Display 32 then prompts any changes desired Y or N. Refill instructions will be requested with the appropriate numeral key 36 to be pressed. Pressing "Enter" function key

36 will automatically enter the drug as directed. You can add other drugs desired in sequential order by pressing the desired drug code numbers followed by pressing "N" or "Y" for changes required. You are then asked to respond to the number of refills desired. Pressing numeral keys 36 to answer refill question, then pressing "Enter" function key 36 to enter the drug. Pressing "Y" for requested changes will give you the ability to move the cursor 36 to the area of desired changes. The cursor is moved to the correction area with the alphanumeric keys 36 used at the site of changes. After all changes are made you then press enter 36 and continue with other medications desired. After entering all the desired prescriptions the "Print" or "Transmit" keys 36 are then pressed to complete the prescription preparation. See Figs. 8 & 9 for examples of these prescriptions.

3. Patient drug database can be accessed by initially entering the "Operate 2" selection on the main screen and then entering the patient name or patient file number. The patients medication use history can then be accessed by pressing "D His" 36 for drug history key function. A list of the patients previous drug history then appears on the screen with listing of medication, date, quantity prescribed, and refills. The cursor keys 36 allow you to continue visualization of the complete drug history. You can then push the "Print" key 36 function to print the drug database history or push the "Exit" key 36 function to return to the main screen. Fig. 16 is an example of a printout on a patient drug use database.

C. HOW TO ENTER PATIENT HISTORY DATABASE INFORMATION AND LATER UTILIZATION OF THIS INFORMATION.

1. After the patients information including name, address, and drug information is entered into the computer you can return to the Main Screen with this device. The Graphic Display 32 now gives you the option to "1. Edit" or "2. Operate" press alphanumeric key 36 "1". The Graphic Display then gives you the option of entering "1. Patient Database", "2. Drug Database", "3. History Database", and "4. Allergy

Database"-Press the alphanumeric key 36 "3" and this will allow you to enter basic historical information. You can then press "Enter" function key 36 to store the data. After the data is stored, the Graphic Display will return to the main screen.

2. After entering the "2. Operate" selection on the main screen the patients name or file number is entered. You may immediately access patient medical history by pressing the function key "M Hist" 36 which provides you with a brief medical history on the patient. This data can be printed by pushing the "Print" function key 36 or you can turn back to the main screen by pressing the "Exit" function key 36.

D. HOW TO ENTER PATIENT ALLERGY DATABASE INFORMATION AND LATER UTILIZATION OF THIS INFORMATION.

1. Upon returning to the main screen (or after turning the power function switch 88 on) enter "1" for edit function then you are given the options "1. Patient Database", "2. Drug Database", "3. History Database", and "4. Allergy Database"- press the alphanumeric key 36 "4" to enter the Allergy Database. You can then press the appropriate alphanumeric keys 36 to enter the patient allergies followed by pressing the key function 36 " ENTER ". After the data is stored the Graphic Display will return to the main screen.

2. After entering the "2. Operate" selection on the main screen patients name for the file number is entered into this device. You can immediately access patient allergy information by pressing the function key 36 "All". The allergies are then listed on the display. The allergy data can then be printed by pressing the function key 36 "Print" or you can return back to the main screen by pressing the function key 36 "Exit".

II. HOW TO TRANSMIT CHARACTER INFORMATION/PRESCRIPTIONS

A. Prescriptions transmission to a pharmacy can be performed with this device via modem transmission to a pharmacy previously registered with the Rx-Script System. The patient information along with the desired prescriptions are entered into the device as described in sections A1-A2 and B1-

B2. The device should be plugged into an acceptable modem device functional with the "Rx-Script" system. The function keys 36 "Shift" followed by "Xmit" should be pressed. The Graphic display will then ask if there are any necessary medical reference numbers or diagnosis asking for a Yes "Y" or No "N" response. If "Y" is entered then the appropriate alphanumeric keys are pressed in response followed by pressing the function key "Enter". If "N" is entered you continue to the next step of entering the clinician code number. The Graphic Display then prompts for the clinician code number which should be entered using appropriate alphanumeric keys 36 followed by pressing the function key 36 "Enter". The Graphic Display 32 will then read "Transmission in progress". When transmission is finished the Graphic display 32 will read "Transmission Completed".

B. Allergy list transfer to pharmacy can be performed by this device via modem transmission to a pharmacy previously registered with the "Rx-Script" system. The patient information can be entered into the device as described in sections A1-A2 followed by access to allergy information as described in sections D1-D2. The device should then be plugged into an acceptable modem device functional with the "Rx-Script System". The function keys 36 "shift" by "Xmit" should be pressed. The Digital Display will prompt for a clinician code number which should then be entered by pressing the appropriate alphanumeric keys 36 followed by pressing function key 36 "Enter". The Graphic Display 32 will then read "Transmission in progress". When transmission is finished the Graphic Display 32 will read " Transmission Complete ".

III. HOW TO CALCULATE MEDICATION DOSAGES

A. Numerical keys, arithmetic symbol keys, and a decimal key are provided to allow for simple drug dosage calculations.

Referring to Figs. 5 - 7, the preferred embodiment of the circuitry for the present invention is seen to include the following features:

20 MICRO-CONTROLLER
22 CHARACTER ROM

52 NON-VOLATILE RAM
54 NON-VOLATILE RAM

24 ADDRESS DECODE	56 NON-VOLATILE RAM
26 MEDICAL LIBRARY EEPROM	58 NON-VOLATILE RAM
32 GRAPHIC DISPLAY	60 NON-VOLATILE RAM
34 PROGRAMMABLE INTERFACE	62 NON-VOLATILE RAM
36 KEYPAD ASSEMBLY	64 NON-VOLATILE RAM
38 PRINTER WITH BUFFER	66 NON-VOLATILE RAM
40 NON-VOLATILE RAM	68 NON-VOLATILE RAM
42 NON-VOLATILE RAM	70 NON-VOLATILE RAM
44 NON-VOLATILE RAM	80 DC ADAPTER PLUG
46 NON-VOLATILE RAM	82 FIVE VOLT REGULATOR
48 NON-VOLATILE RAM	84 BATTERY PACK
50 NON-VOLATILE RAM	86 THERMAL RESISTOR
	88 POWER FUNCTION SWITCH

CLAIMS

1. A portable drug prescription issuing apparatus, comprising:
 - means for entering drug prescription related information in storage including
 - a physician's prescription list of drugs commonly prescribed by the physician,
 - a security access code for the physician, and
 - a prescription heading including the physician's name and registration number;
 - means for accessing, through entry of the security access code, from storage for viewing on a display of the hand held portable prescription printing and transmitting device prestored drug prescription related information including patient information and drug related information for a prescription to be printed for the patient;
 - means for hand carrying the hand held portable prescription printing and transmitting device to a site at which a printed prescription for a patient is required;
 - means for creating at the site on the screen with a pencil digitizer a facsimile of the signature of the physician issuing the prescription;
 - means for selecting at the site prestored patient related information and drug related information for printing on the drug prescription; and
 - means for printing at the site with the hand held prescription printing and transmitting device a printed prescription on prescription paper a prescription including the prescription heading including the name of the physician corresponding to the security access code and selected prestored patient related information and drug related information.
2. The apparatus of claim 1 in which said drug related information includes a code for each of the drugs commonly prescribed by the physician corresponding to the security access code.

3. The apparatus of claim 1 in which the stored drug prescription information includes drug prescription information for each patient, the drug name, drug dosages, drug usage instruction, and indication of whether refills are permitted and whether generic substitutes are allowed, all of which are printed on the prescription together with the physician's heading.

4. A method of portably issuing drug prescriptions comprising the steps of:

- entering for storage drug prescription related information in a hand held, battery powered, portable, prescription printing and transmitting device including a physician's prescription list of drugs commonly prescribed by the physician,

- a security access code for the physician, and

- a prescription heading including the physician's name and registration number;

- accessing, through entry of the security access code, from storage for viewing on a display of the hand held portable prescription printing and transmitting device prestored drug prescription related information including patient information and drug related information for a prescription to be printed for the patient;

- hand carrying the hand held portable prescription printing and transmitting device to a site at which a printed prescription for a patient is required;

- creating at the site on the screen with a pencil digitizer a facsimile of the signature of the physician issuing the prescription;

- selecting at the site prestored patient related information and drug related information for printing on the drug prescription; and

- printing at the site with the hand held prescription printing and transmitting device a printed prescription on prescription paper a prescription including the prescription heading including the name of the physician corresponding to the security access code and selected prestored patient

related information and drug related information.

5. The method of claim 4 in which said drug related information includes a code for each of the drugs commonly prescribed by the physician corresponding to the security access code.

6. The method of claim 4 in which
the stored drug prescription information including drug prescription information for each patient, the drug name, drug dosages, drug usage instruction, and indication of whether refills are permitted and what the generic substitutes are allowed, all of which are printed on the prescription along with the physician's heading.

7. A portable, hand-held, drug prescription issuing device, comprising:

A) memory means for storing data including patient file number, patient address, patient telephone number, patient medical history, patient allergies, and clinician medication lists;

B) printing means for printing data to include medical history, allergies, diagnosis, and medication reference numbers;

C) computer processing means to interact commands with programmed information and ability to communicate this information by way of the graphic display, printer, or modem transmission;

D) communications means including a graphic display printer, and modem transmission output;

E) security means requiring each individual clinician to use a predesignated code number;

F) specialized calculating means to assist the clinician with calculating dosages.

8. The device of claim 7 including data entry means for entering general patient information including name, address, telephone number, and patient file number for storage.

9. The device of claim 8 in which data entry means for entering basic patient medical history for storage.

10. The device of claim 9 in which the data entry means

for entering patient allergy history for storage.

11. The device of claim 10 in which the data entry means includes means for each clinician to enter his or her personally preferred medication list with quantity and refill preference.

12. The device of claim 11 including means for printing or transmit on command any prescription entered by the physician either as a new entry or recalled by a code number previously entered for preferred prescriptions of the physician.

13. The device of claim 12 in which the computing means includes means to provide on command, patient medication use including past refill information.

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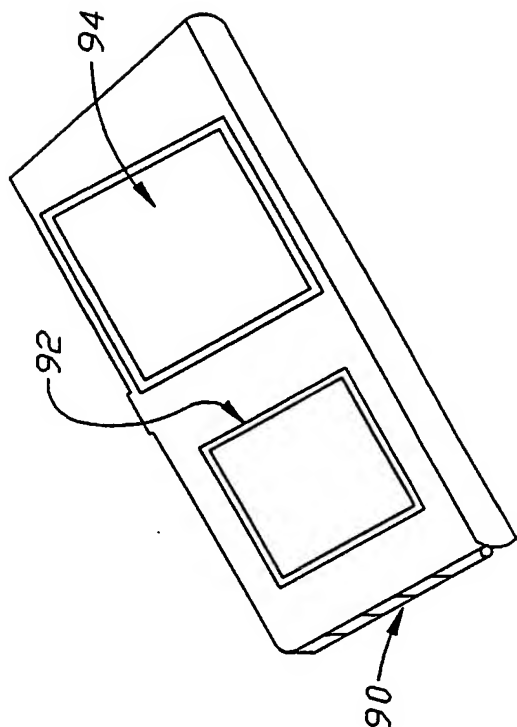
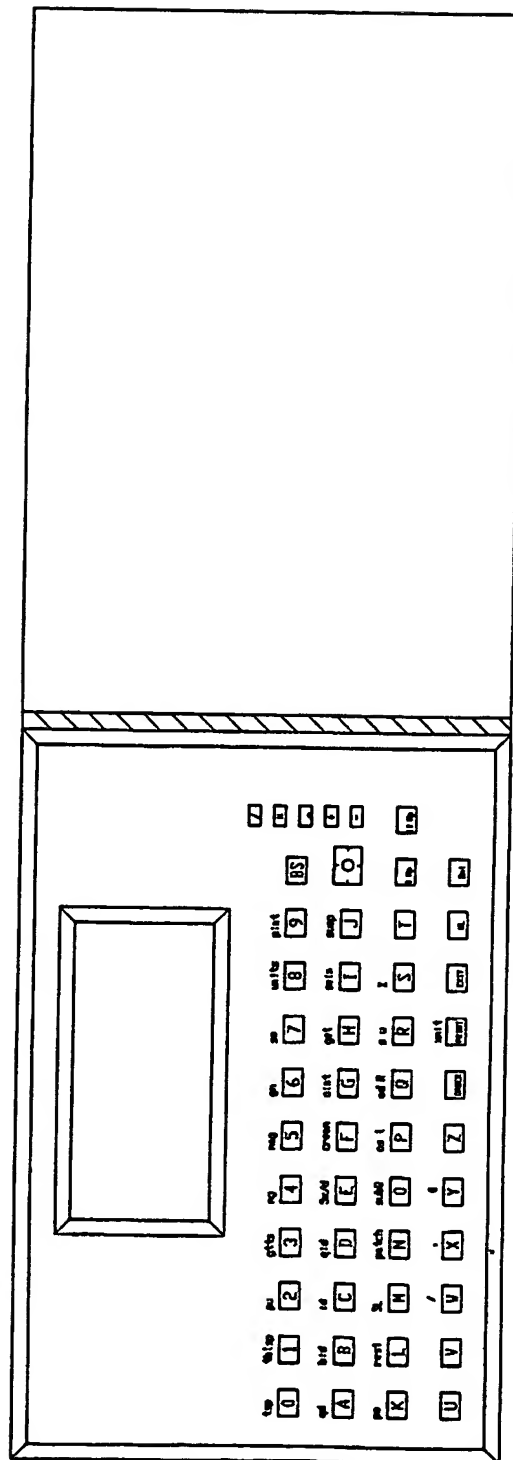


FIG. 1

FIG. 2



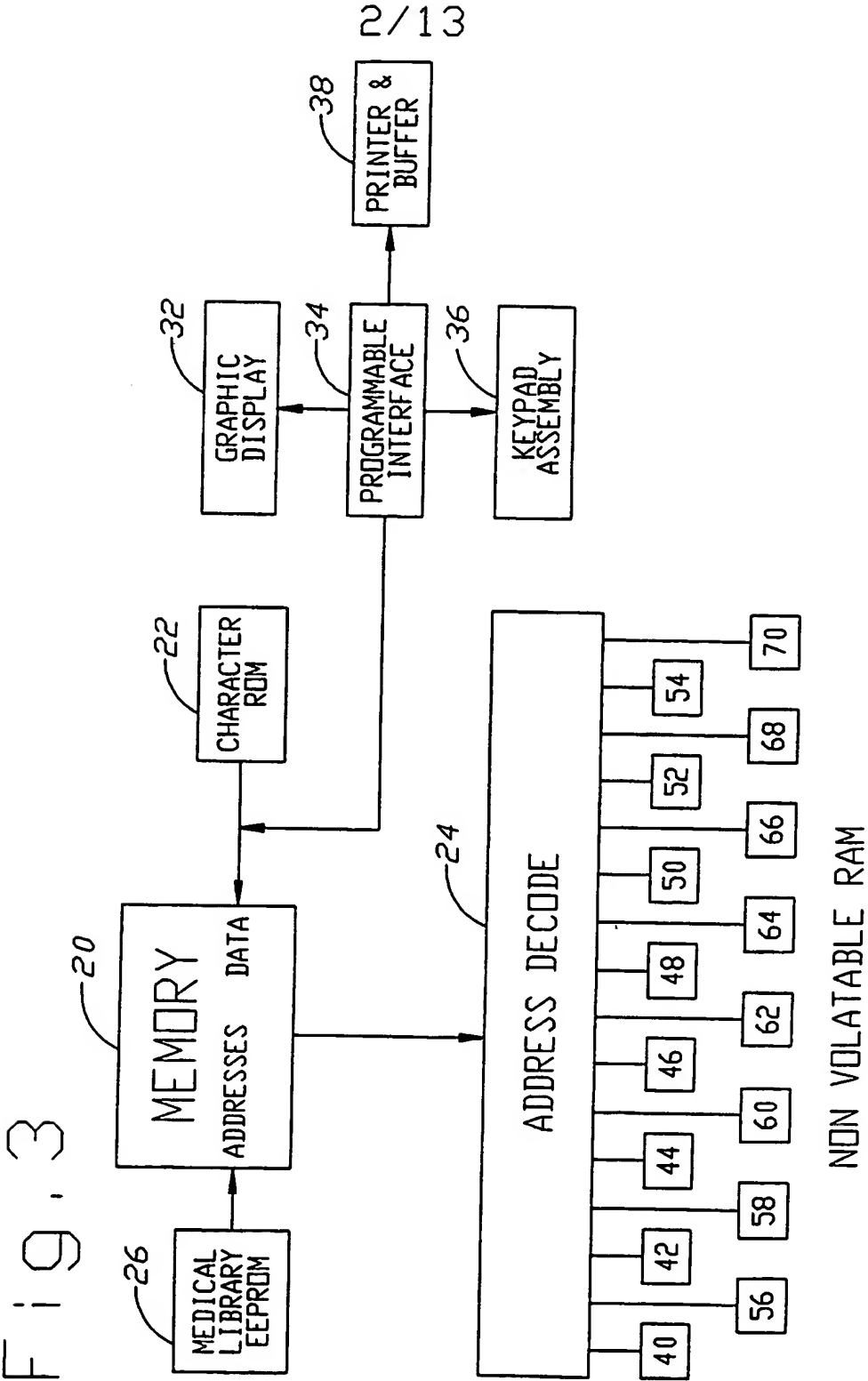


Fig. 4A 3/13

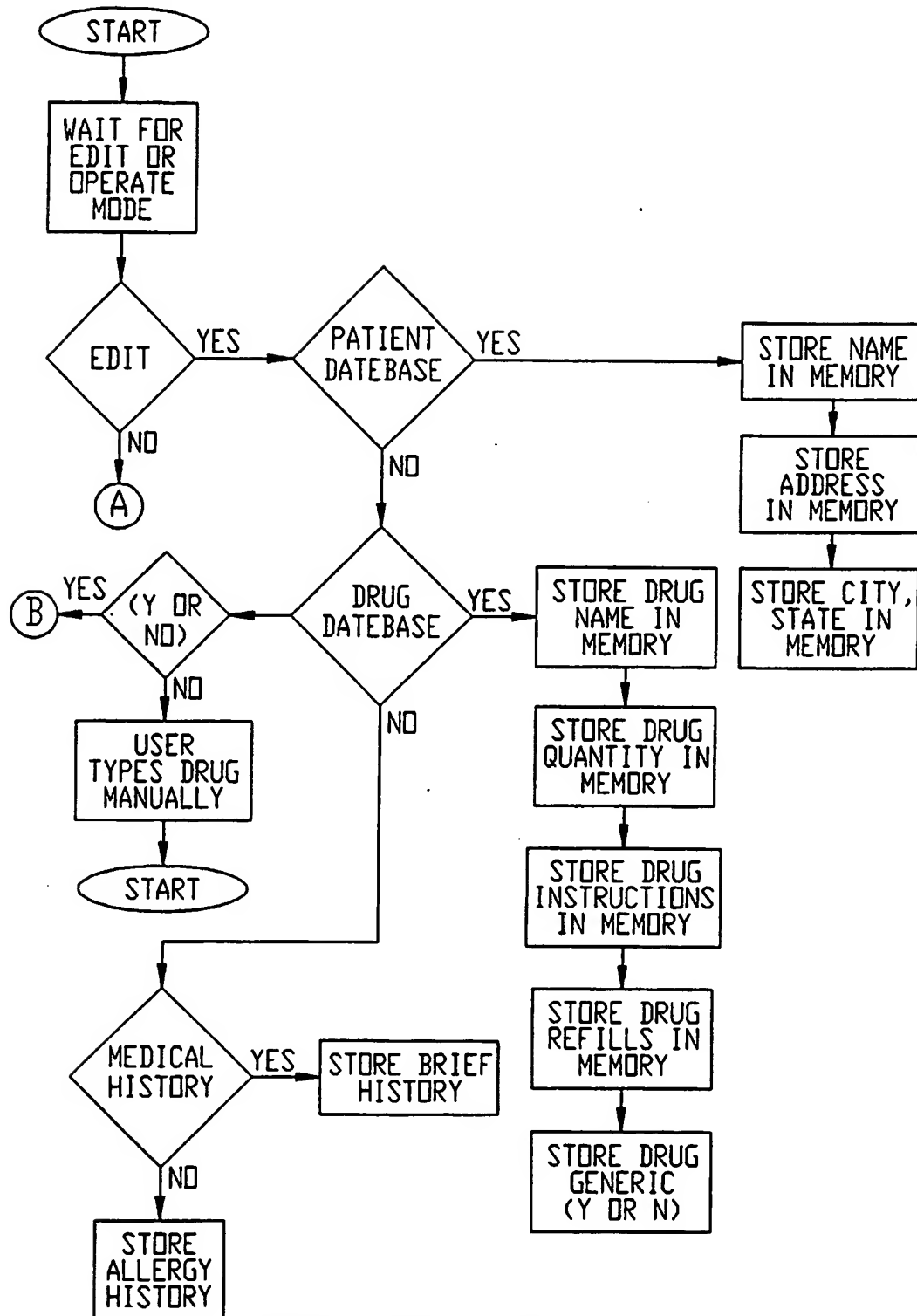
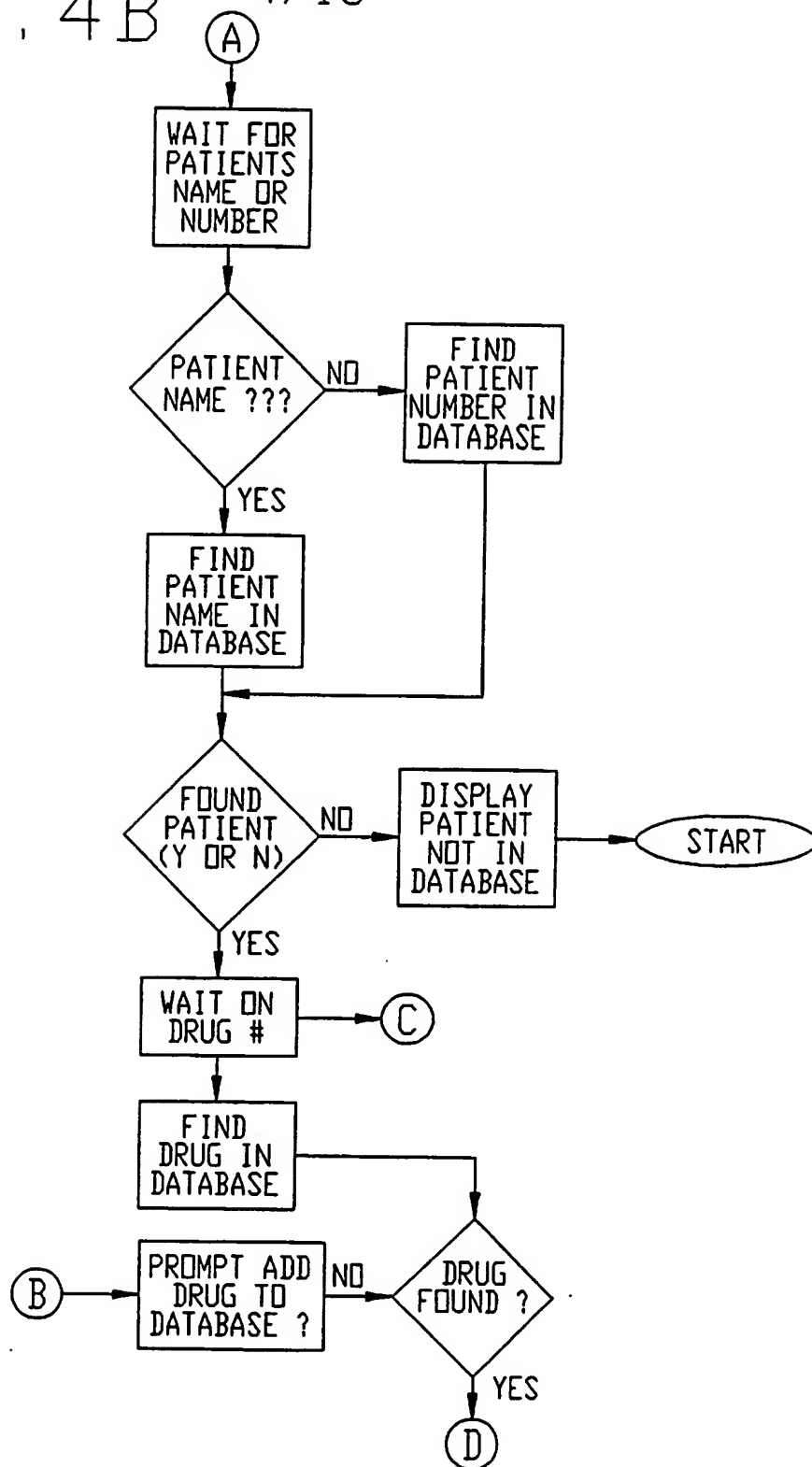
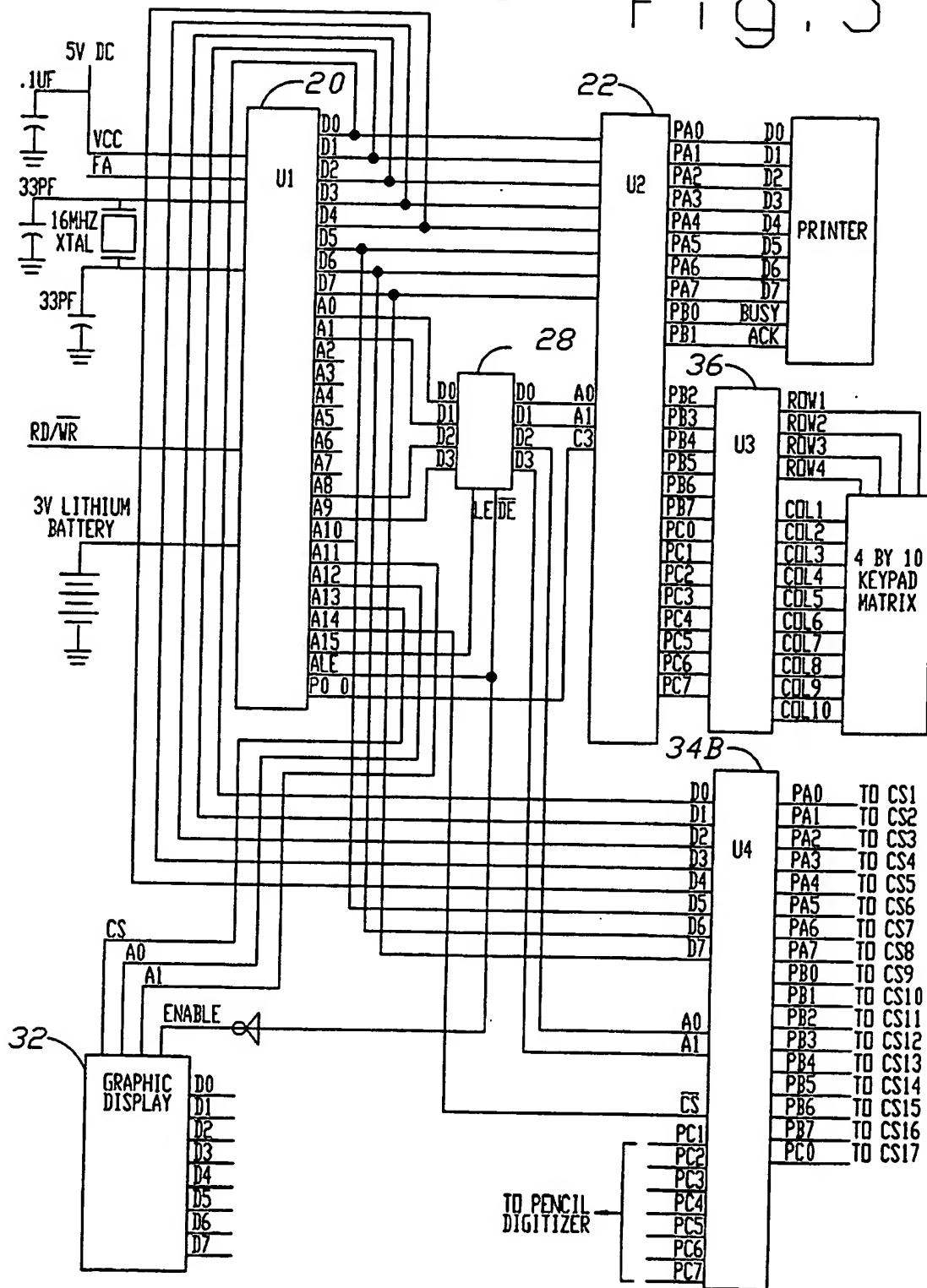


Fig. 4B 4/13



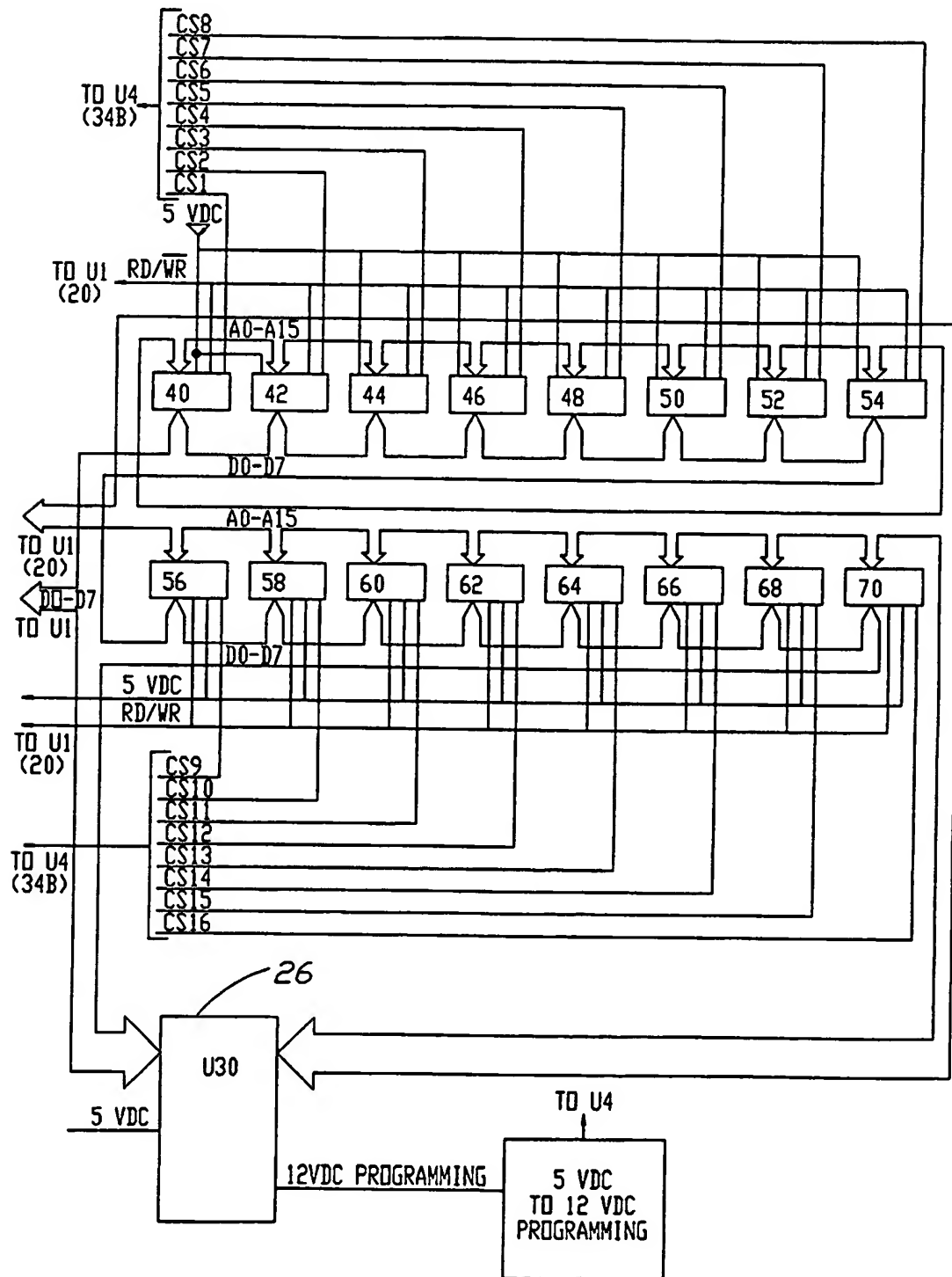
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Fig. 5



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Fig. 6 7/13



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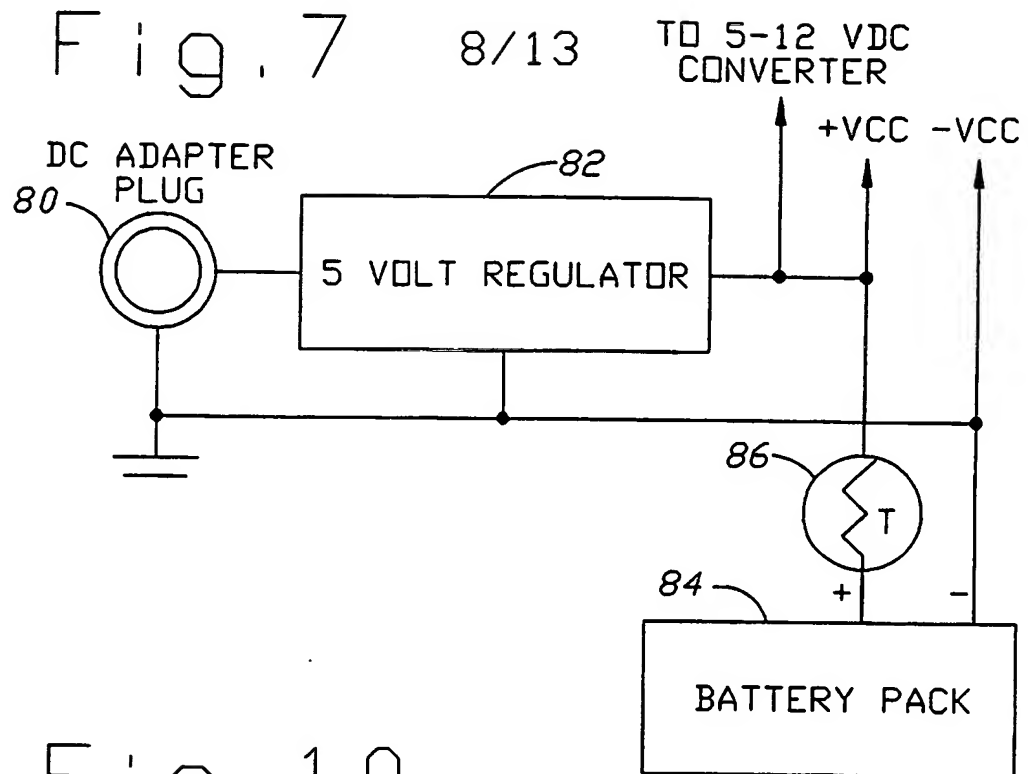


Fig. 10

PREPRINTED PHARMACY NAME & ADDRESS	
11/11/91	08:08:00
RX# 0000000000	
JOHN DOE	
P.O. BOX 0000	
ANYPLACE, MS 00000	
DISSOLVE ONE TAB UNDER TONGUE AS NEEDED FOR CHEST PAIN	
NITROSTAT 0.4 MG SUB PARK	
QTY 100	MFG PARKE DAVIS
DR. JOHN JUAN	
DR. MUST AUTHORIZE REFILL	

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Fig. 8

Dr. JOHN JUAN
ABC MEDICAL CLINIC
123 ANY STREET
ANYWHERE, USA 11111
(555)-555-5555
DEA # 000000000000

11/11/91 08:08:00

JOHN DOE
000 HILL DRIVE
ANYPLACE, MS 00000

DYNACITE 2.5 MG (#60)
SU: TAKE 1 CAPSULE
BID FOR HYPERTENSION

LABEL:Y REFILLS: 2

BIAXIN 500 MG (#20)
SU: TAKE 1 BID
UNTIL COMPLETE

LABEL:Y REFILLS: 0

DISPENS AS WRITTEN:Y

SUBSTITUTION :N
DERMISSABLE

SUBSTITUTE SHEET (RULE 26)

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Fig. 9

Dr. JOHN JUAN
ABC MEDICAL CLINIC
123 ANY STREET
ANYWHERE, USA 11111
(555)-555-5555
DEA # 00000000000

11/11/91 08:08:00

JOHN DOE
000 HILL DRIVE
ANYPLACE, MS 00000

DYNACITE 2.5 MG (#60)
SU: TAKE 1 CAPSULE
BID FOR HYPERTENSION

LABEL:Y REFILLS: 2

DISPENS AS WRITTEN:Y

SUBSTITUTION :N
PERMITTED

BIAXIN 500 MG (#20)
SU: TAKE 1 BID
UNTIL COMPLETE

LABEL:Y REFILLS: 0

DISPENS AS WRITTEN:Y

SUBSTITUTION :N
PERMITTED

11/13

Fig. 11

[PREPRINTED PHARMACY NAME & ADDRESS]	
11/11/91	08:08:00
RX# 0000000000	
JOHN DOE	
P.O. BOX 00	
ANYPLACE, MS 00000	
DISSOLVE ONE TAB UNDER TONGUE AS NEEDED FOR CHEST PAIN	
NITROSTAT 0.4 MG SUB PARK	
QTY 100	MFG PARKE DAVIS
DR. JOHN JUAN	
DR. MUST AUTHORIZE REFILL	

Fig. 12

JOHN DOE	
000 HILL DRIVE	
ANYWHERE, MS 00000	
3/10/89	08:00

Fig. 13 12/13

Dr. JOHN JUAN	
ABC MEDICAL CLINIC	
123 ANY STREET	
ANYWHERE, USA 11111	
(555)-555-5555	
DEA # 000000000000	
<hr/>	
11/11/91	08:08:00
JOHN DOE	
000 HILL DRIVE	
ANYPLACE, MS 00000	
11/10/89 16:05	
<hr/> PATIENT MEDICAL HISTORY	
<hr/>	
CHF. IDDM. CAD.	
TAH-BSD. APPY	

Fig. 14

Dr. JOHN JUAN	
ABC MEDICAL CLINIC	
123 ANY STREET	
ANYWHERE, USA 11111	
(555)-555-5555	
DEA # 000000000000	
<hr/>	
11/11/91	08:08:00.
JOHN DOE	
000 HILL DRIVE	
ANYPLACE, MS 00000	
11/10/89 16:05	
<hr/> PATIENT ALLERGY HISTORY	
<hr/>	
MORPHINE, ASPIRINE, PENICILLIN	

SUBSTITUTE SHEET (RULE 26)

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Fig. 15

001	CECLOR 250MG /5CC 150CC SIG: TAKE 1 tsp U.C. REFILLS 2
002	DYNACIRC 2.5MG #60 SIG: TAKE 1 CAPSULE BID FOR HIGH BLOOD PRESSURE

Fig. 16

8/10/89	8:00
CECLOR 250MG /5CC (150CC) SIG: TAKE 1 tsp TID U..C.	
8/15/89	8:02
DYNACIRC 2.5MG #60	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/04563**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) : G06F 159:00

US CL : 364/413.01, 413.02, 413.03

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/413.01, 413.02, 413.03

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,072,383 (BRIMM ET AL) 10 DECEMBER 1991, see the entire document, particularly col. 6, lines 34-68, col. 7, lines 1-20 and 36-43, col. 9, lines 1-16.	1-13

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

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